lowers the pressure inside sieve tubes. (Flow) Result is a pressure gradient from source end to sink end. This gradient pushes solutes along sieve tubes towards sink. When they reach sink the solutes will be used up (e.g. in respiration) or stored (e.g. as starch). The higher the concentration of sucrose at source, the higher the rate of translocation.

There is evidence both for and against mass flow. The supporting evidence shows that if a ring of bark is removed from a woody stem, swelling occurs. The liquid found in this swollen region are found to have a higher concentration of sugars than fluid below the region. Conclusion is that phloem is tissue responsible for translocating sugars.
Another evidence is that pressure in the phloem can be investigated using aphids which have needle-like mouthparts which penetrate the phloem. They can be used to extract the contents of the sieve tubes.

Radioactive tracer e.g. radioactive carbon (14C) can be used to track the movement of organic substances in a plant. If metabolic inhibitor (stops ATP production) is put into the phloem, then translocation stops, this is evidence that active transport is involved.

The objections to this is that sugar travels to many different sinks, not just one with the highest water potential. Also, the sieve plates would create a barrier to mass flow. A lot of pressure needed for solutes to get through.

Evidence from radioactive tracers:

Radioactive tracers can be used for the translocation of solutes. This can be done by supplying part of plant with organic substance that has a radioactive label, tracking its movement.
Movement of these substances can be tracked using autoradiography. The plant is killed and then the plant is placed onto photographic film, wherever film turns black, the radioactive substance is present. The results show translocation of substances form source to sink.

Preview from Notesale.co.uk
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